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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,105	05/23/2001	David Walter Rose	1320-050	2447

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EXAMINER

LU, TOM Y

ART UNIT PAPER NUMBER

2621

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/864,105	ROSE, DAVID WALTER	
	Examiner	Art Unit	
	Tom Y Lu	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment and written response filed on November 6, 2004 has been entered.
2. Claims 1, 11 and 21 have been amended.
3. Claims 1-21 are pending.

Response to Arguments

4. Applicant's arguments, see Remarks pages 12-13, filed on November 6, 2004, with respect to the rejection(s) of claim(s) 1, 11 and 21 under 35 U.S.C. 102 (e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wood et al (U.S. Patent No. 4,842,411).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 5-7, 11-12, 15-16 and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood et al (U.S. Patent No. 4,842,411).
 - a. Referring to Claim 1, Wood discloses projecting a two-dimensional pattern of alternating relatively lighter and relatively darker regions of varying widths upon a surface at a first angle relative to said surface (Wood in figure 1 shows a light pattern projector 13 is at an angle of 90 degrees projecting a pattern of relatively

lighter and relatively darker regions of varying widths as shown in figure 3, column 2, lines 65-67); capturing an image of said pattern from a second angle relative to said surface (for example, CCD array sensor 4 is used to capture an image of the pattern, column 3, lines 35-40. Note the CCD sensor 4 is placed at a different angle from the projector, see figure 1); and processing said image to produce a profile of said surface (the image captured by the CCD sensor 4 is processed in parallax measurement processor 23 to determined shape of the surface and the depth measurements, column 4, lines 64-67).

- b. Referring to Claim 2, Wood discloses said projecting activity projects discrete multiple ones of said patterns; said capturing activity captures an image of each said patterns; and said processing activity processes each of said image (Wood at column 3, line 6 teaches projecting periodic patterns on a continuous surface of an object carried by a conveyor belt, column 1, lines 50-59, and such periodic patterns are captured continuously by the CCD sensor 4, and processed by the processor 23).
- c. Referring to Claim 5, Wood discloses producing an image signal in response to said image (column 4, lines 6-7, the digitized gray scale signal for the image captured by CCD sensor 4 is the claimed "image signal"); and correlating said image signal with a reference signal to produce said profile said surface (the image signal produced by CCD sensor 7 is the claimed "reference signal", and the signals produced by CCD sensors 4 and 7 respectively, are correlated and compared to determine the shape of the surface, column 4, lines 63-64).

- d. Referring to Claim 6, Wood discloses configuring said reference signal to correspond to said pattern projected by said projecting activity (the image signal captured by CCD sensor 7 is defined as a reference signal herein is configured to correspond to said pattern projected by said projecting activity. Column 4, lines 6-31).
- e. Referring to Claim 7, Wood discloses partitioning said image into at least one image region, wherein one said image region is responsive to a portion of said pattern projected upon said surface (column 4, lines 14-15, the segments are the claimed "image regions", which are portions of the projected pattern); producing an image signal in response to said one image region (the digitized image segment is the claimed "image signal"); correlating said image signal with a reference signal configured to correspond to said image region to produce a correlation signal (the corresponding points at column 4, line 18 are the claimed "correlation signal"); and determining, in response to said correlation signal, a relative height of said surface upon which said portion of said pattern was projected (based upon the corresponding points, the height of said surface, the depth, is determined, column 4, line 38).
- f. With regard to Claim 11, see explanation in Claim 1.
- g. With regard to Claim 12, see figure 3.
- h. With regard to Claim 15, see figure 1 and column 4, lines 6-31, the first camera is CCD sensor 4, and the second camera is CCD sensor 7. The images captured by

two CCD sensors respectively, are correlated to determine the shape of the surface.

- i. Referring to Claim 16, Wood discloses said projector is configured to project said pattern with said relatively lighter regions of substantially a predetermined monochromaticity; and said camera is filtered to be sensitive to said relatively lighter regions of substantially said predetermined monochromaticity (the CCD sensors must be filtered to be sensitive otherwise, it would not be able to process to the image signals and determine the corresponding points).
- j. With regard to Claim 19, see figures 1 and 3.
- k. With regard to Claim 20, see figure 3, and column 3, lines 18-19.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 8-9 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. The arguments in Paragraph 5 above as to the applicability of Wood are incorporated herein.

- a. Referring to Claim 8, the only difference between Claim 8 and Claim 7 is Claim 8 calls for at least twenty-five image regions instead of at least one image region. Wood teaches his system partition the image captured by the CCD sensor 4 into plurality of segments, however, Wood does not explicitly states the number of the partition will be at least

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twenty-five. At the time the invention was made, it would have been an obvious matter of design choice to modify the Wood reference by partitioning the image into at least twenty five regions, since applicant has not disclosed that having at least twenty five regions would solve any stated problems or post any significant advantages.

- b. With regard to Claim 9, see explanation of Claim 8 and 5.
- c. Referring to 17, Wood does not explicitly disclose projector comprises a laser; the examiner takes official notice herein that Wood's projector can be a laser projector because it is merely a design choice to pick a laser as a projector, and since the light source of the projector is insignificant in this invention, it would not carry any patentable weight; and said laser produces said relative lighter regions of substantially said predetermined monochromaticity (the projector 13 comprises a laser to produce relative lighter regions of substantially said predetermined monochromaticity because by default the predetermined monochromaticity would be pure white with a gray value of 255 on a 8-bit scale).
- d. Referring to Claim 18, the examiner takes official notice that the projector in Wood's system can be a stroboscopic projector because it is simply a design choice.

7. Claims 3-4, 10, 13-14 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al in view of Fukuhara et al (U.S. Patent No. 4,653,316). The arguments in Paragraph 5 above as to the applicability of Wood are incorporated herein.

- a. Referring to Claim 3, Wood discloses a system using projector 13 and sensors 4 and 7 to determine the shape of the surface of an object. However, Wood does not teach applying the system on detecting road surface. Fukuhara discloses a system

using a projector 24B and cameras 22 and 23 to detect characteristics of the road surface to create transverse profile and longitudinal profile of the road surface (Fukuhara: column 1, lines 32-52). By applying Wood's system in road surface detecting environment as described in Fukuhara, the combination of Wood and Fukuhara teaches a projector is configured to effect said projecting activity, wherein vehicle is configured to move in a vehicular direction and said width is substantially perpendicular to said vehicular direction; a camera is configured to effect said capturing activity; and moving said vehicle over said surface in said vehicular direction while effecting the projecting and capturing activities so as to obtain the captured image. At the time the invention was made, a person of ordinary skill in the art would have been motivated to do this because Wood column 5, lines 54-58 teaches the scope of his invention is not only applicable to the surface of an object carried by a conveyor belt but to other fields as well, which implies it can be applied to road surface detection as described in Fukuhara.

- b. Referring to Claim 4, the combination of Wood and Fukuhara teaches repeating said projecting and capturing activities at intervals along said vehicular direction to obtain a series of said captured images; and deriving a profile of said surface in substantially said vehicular direction from said series captured image (Wood column 2, lines 32-34, also see figure 1 for direction; Fukuhara: column 1, lines 32-52).
- c. With regard to Claim 10, see explanation in Claims 3, 4 and 8.

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- d. With regard to Claim 13, see explanation in Claims 3 and 4.
- e. With regard to Claim 14, see explanation in Claims 3 and 4.
- f. With regard to Claim 21, see explanation in Claims 1, 3 and 4.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Y Lu whose telephone number is (703) 306-4057. The examiner can normally be reached on 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Y. Lu



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